## **CLAIMS**

What is claimed is:

1. A method of EGR recovery comprising:

calculating a transient volume of EGR sufficient to maintain NOx emitted by an engine below a predetermined level during a period of transient operation of said engine;

supplying an actual volume of EGR during said period of transient operation; measuring said actual level of EGR during said period of transient operation; calculating an EGR deficit between said transient volume of EGR and said actual volume of EGR during said period of transient operation;

integrating said EGR deficit over said period of transient operation to calculate a deficit volume of EGR;

calculating a following steady-state volume of EGR sufficient to maintain NOx emitted by said engine below said predetermined level during a following period of substantially steady-state operation of said engine; and

supplying said following steady-state volume of EGR plus said deficit volume of EGR during said following period of substantially steady-state operation of said engine.

2. The method of EGR recovery of claim 1, comprising further:

calculating a leading steady-state volume of EGR sufficient to maintain NOx emitted by an engine below said predetermined level during a leading period of substantially steady-state operation of said engine;

supplying said leading steady-state volume of EGR during said leading period of substantially steady-state operation of said engine.

3. The method of EGR recovery of claim 1, comprising further: reducing said actual volume of EGR during said period of transient operation.

- 4. The method of EGR recovery of claim 1, comprising further: normalizing said EGR deficit to produce a unitless parameter.
- 5. The method of EGR recovery of claim 1, comprising further: freezing said integration via a bit mask.
- 6. The method of EGR recovery of claim 1, comprising further: freezing said integration at a load threshold.
- 7. The method of EGR recovery of claim 1, comprising further: adjusting a duration of said following period of substantially steady-state operation of said engine.
- 8. The method of EGR recovery of claim 1, comprising further:
  reducing said deficit volume of EGR supplied during said following period of
  substantially steady-state operation of said engine if an air-to-fuel ratio approaches a
  smoke limit air-to-fuel ratio.
- 9. The method of EGR recovery of claim 1, wherein said period of transient operation is selected from the group consisting of:

acceleration,

deceleration.

braking,

engine braking, and

lugging.

10. A system for EGR recovery comprising:

means for calculating a transient volume of EGR sufficient to maintain NOx emitted by an engine below a predetermined level during a period of transient operation of said engine;

means for supplying an actual volume of EGR during said period of transient operation;

means for measuring said actual level of EGR during said period of transient operation;

means for calculating an EGR deficit between said transient volume of EGR and said actual volume of EGR during said period of transient operation;

means for integrating said EGR deficit over said period of transient operation to calculate a deficit volume of EGR;

means for calculating a following steady-state volume of EGR sufficient to maintain NOx emitted by said engine of said engine below said predetermined level during a following period of substantially steady-state operation of said engine; and

means for supplying said following steady-state volume of EGR plus said deficit volume of EGR during said following period of substantially steady-state operation of said engine.

11. The system for EGR recovery of claim 10, comprising further:

means for calculating a leading steady-state volume of EGR sufficient to maintain NOx emitted by said engine below said predetermined level during a leading period of substantially steady-state operation of said engine;

means for supplying said leading steady-state volume of EGR during said leading period of substantially steady-state operation of said engine.

12. The system for EGR recovery of claim 10, comprising further:

means for reducing said actual volume of EGR during said period of transient operation.

- 13. The system for EGR recovery of claim 10, comprising further: means for normalizing said EGR deficit to produce a unitless parameter.
- 14. The system for EGR recovery of claim 10, comprising further: means for freezing said integration via a bit mask.
- 15. The system for EGR recovery of claim 10, comprising further: means for freezing said integration at a load threshold.
- 16. The system for EGR recovery of claim 10, comprising further: means for adjusting a duration of said following period of substantially steady-state operation of said engine.
- 17. The system for EGR recovery of claim 10, comprising further:

  means for reducing said deficit volume of EGR supplied during said following
  period of substantially steady-state operation of said engine if an air-to-fuel ratio
  approaches a smoke limit air-to-fuel ratio.